



HEALTH AFFAIRS

**Military Health System
Information Management/Information Technology
Benefits Management Program**

Supplement (Toolkit) - Part 1

Prepared By:
**Office of the Assistant Secretary of Defense (Health Affairs)
Information Management, Technology and Reengineering**

**Updated
September 30, 1999**

Preface

As Military Health System (MHS) managers engage in the process of implementing the MHS Information Management/Information Technology (IM/IT) Benefits Management Program across the MHS, specific, detailed, technical questions may arise. This document is an additional tool for MHS managers to reference as they implement this program and is intended to be used as a supplement to the MHS IM/IT Benefits Management Program Guidebook. It is important to note that the Functional Economic Analysis Guidebook and the OD (Program Analysis & Economic) AIS Economic Analysis Guide were never formerly approved. However, they still provide valid and useful management guidance and should be viewed as such.



Identifies innovative ideas supported by the MHS IM/IT Benefits Management Program

TABLE OF CONTENTS

1. ABSTRACTS OF MAJOR INFORMATION MANAGEMENT/INFORMATION TECHNOLOGY (IM/IT) POLICY FOR MILITARY HEALTH SYSTEM (MHS) PROGRAMS	1
1.1 Department of Defense (DoD) Guide for Managing Information Technology as an Investment, and Measuring Performance (6 January 1997, Assistant Secretary of Defense for Command, Control, Communications, and Intelligence (ASD C3I))	1
1.2 Information Technology Management Reform Act of 1996 (ITMRA), PL 104-106, Sections 5001 through 5312, National Defense Authorization Act for Fiscal Year 1996.	2
1.3 MHS Strategic Plan Goals that are related to IM/IT	2
1.4 Technical Architecture Framework For Integration Management (TAFIM)	4
1.5 Office of Management and Budget (OMB) Circular A-130, Management of Federal Information Resources (1994)	4
1.6 OMB Circular A-123, Management Accountability & Control (1995)	5
1.7 OMB Circular A-94, Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs, (29 October 92)	5
1.8 Public Law: The Government Performance Results Act of 1993	5
1.9 Office of the Director, Program Analysis & Evaluation (OD PA&E), Automated Information System (AIS) Economic Analysis Guide, 1 May 1995	5
2. STEP 1—INFORMATION MANAGEMENT/INFORMATION TECHNOLOGY (IM/IT) BUSINESS PROCESS REENGINEERING (BPR) INITIATIVE	6
2.1 Performance Measurement Analytical Techniques	6
2.1.1 The Balanced Scorecard—A Structured Use of Performance Measures	6
2.1.2 Abstracts of Major Articles Related to Analytic Techniques	8
2.2 Performance Measures used in Industry	9
2.2.1 Health Care Delivery Performance Measurements	9
2.2.2 Accounting Performance Measurements	10
2.2.3 Clerical Performance Measurements	10
2.2.4 Legal Performance Measurements	10
2.2.5 Management Performance Measurements	11
2.2.6 Personnel Performance Measurements	12
2.2.7 Quality Assurance Performance Measurements	13
2.2.8 Information Technology Performance Measurements	14
2.3 Operational Performance Measurement Bibliography	15

3. STEP 2—BENEFITS ASSESSMENT	16
3.1 Benefits Assessment Process	16
3.2 Categorize Benefits	17
3.2.1 Define Cost Benefits	17
3.3 Developing Cost Estimates	18
3.3.1 Not All Dollar Values Are Equivalent	20
3.3.2 Financial Savings	20
3.3.3 Cost Avoidance Benefits	21
3.3.4 Opportunity Cost Benefits	21
3.3.5 Quality, Access, and Medical Readiness Benefits	22
3.4 Create Credible Benefits	23
3.5 Data Sources	23
3.6 Functional Economic Analysis Process	24
3.6.1 FEA Summary	24
3.7 Economic Analysis Tools	25
 4. STEP 3—BENEFITS REALIZATION	 27
4.1 Benefits Realization Process	27
4.1.1 Purpose	27
4.2 Process	28
 5. STEP 4—BENEFITS EVALUATION AND MONITORING	 29
5.1 Purpose	30
5.2 Functional Area Benefits Management	31

1. ABSTRACTS OF MAJOR INFORMATION MANAGEMENT/INFORMATION TECHNOLOGY (IM/IT) POLICY FOR MILITARY HEALTH SYSTEM (MHS) PROGRAMS

1.1 Department of Defense (DoD) Guide for Managing Information Technology as an Investment, and Measuring Performance (6 January 1997, Assistant Secretary of Defense for Command, Control, Communications, and Intelligence (ASD C3I))

Briefly, the new policy directs that from now on, DoD IT projects will be managed using quantitative performance measures. Specifically,

- Outcomes must advance overall organizational goals and objectives;
- Measures must go beyond “on-time and under budget”;
- Applies to all ongoing and future IT projects;
- Implemented at enterprise, program, and project levels; and,
- No one set of tools is recommended over any other.

The DoD-wide definition of “performance measurement” is as follows:

the assessment of effectiveness and efficiency of IT in support of the achievement of an organization’s missions, goals and quantitative objectives through the application of outcome-based, measurable, and quantifiable criteria, compared against an established baseline, to activities, operations, and processes.

As a direct result of Information Technology Management Reform Act of 1996, DoD is establishing guidelines for performance- and results-based management of IT investments. In short, “To demonstrate success, each program, project, and acquisition must institutionalize outcome-oriented performance measures; performance must be evaluated over time using these measures.” These guidelines apply to all levels of decision-making; although the bulk of the attention is on the project level, the effort at the enterprise and program level is also discussed in some detail.

At the enterprise level, performance measurement starts with defining the organizational missions and goals and objectives to accomplish that mission. Outcome-oriented measures for periodic review of IT investments are then developed. At the program level, the organizational mission must be understood, IT efforts identified and current status reviewed, and functional outcome requirements defined and documented. Objectives may derive from Business Process

Reengineering (BPR) or Economic Analysis/Analysis of Alternatives (EA/AOA). These will in turn define performance measures for those requirements.

The nuts and bolts of the paper lie at the project level. IT investments and overall missions and objectives must be identified. What is repeatedly stressed is that managers must “tie the investment of dollars to the achievement of some result,” for “the accomplishment of functional missions and goals (mission benefit), not project completion on time and within budget, is the most important outcome of success for any IT project.” A range of criteria for performance measures are described, including measurability, that they support decision-making, focus accountability, measure how the effort meets objectives, and focus on the value-added by IT. Flow-charts and worksheets step the project manager through the process of defining, collecting, validating, and using these measures to improve performance.

The most useful part of this paper, however, is the last chapter, a review of performance measurement tools: IT Effectiveness Framework, IT Efficiency Framework, Performance Measures for IT Approach, Productivity Measures for IT, Enhanced Cost-Benefit Analysis, Information Economics, and Activity-Based Costing. A brief description with examples is given for each, and the strengths and weaknesses are evaluated. No one tool is recommended; this lack of standardization, however, will make comparisons of IT performance evaluations difficult.

1.2 Information Technology Management Reform Act of 1996 (ITMRA), PL 104-106, Sections 5001 through 5312, National Defense Authorization Act for Fiscal Year 1996.

Under this Act, the head of each executive agency is required to design and implement processes for maximizing the value and assessing and managing the risks of IT acquisitions. Criteria for maximizing value must include quantitatively expressed projected net, risk-adjusted return on investment (ROI), and quantitative and qualitative criteria for comparing alternative projects. Further, performance measurements must be established for all IT currently used, or to be acquired. Agencies must quantitatively benchmark their performance in terms of cost, speed, productivity and quality of outputs and outcomes. The missions of the executive agency must be evaluated and revised as appropriate before making significant IT investments. Agency heads are also required, to the maximum extent practicable, to use modular contracting for the acquisition of major IT systems. A Chief Information Officer (CIO) is established within each executive agency.

This act was passed as part of the National Defense Authorization Act for Fiscal Year 1996, and signed into law 10 February 1996.

1.3 MHS Strategic Plan Goals that are related to IM/IT

The MHS Strategic Plan was signed jointly by the Surgeons General (SGs) of the Army, Navy, and the Air Force, and the Assistant Secretary of Defense (Health Affairs) (ASD) (HA). The Plan’s vision statement says that the MHS is committed to the following:

- Readiness for joint operations in a dynamic global environment;
- Provision of top quality cost-effective health benefits;
- Development of military and civilian leaders who excel in a changing world; and,
- Innovation and the application of new technology.

The Strategic Plan identifies five goals of the MHS. The MHS IM/IT Benefits Management Program directly supports three of the MHS goals:

1. MHS Goal 1 Joint Medical Readiness Capabilities: We will ensure that our joint medical readiness capabilities prepare us to respond successfully to a rapidly changing continuum of military operations.

The continuum of military operations covers a myriad of medical readiness requirements, executed in an environment of increasing uncertainty and diminishing resources. The primary mission of the MHS is to ensure that our combatant commands have the most capable medical readiness support to meet their everchanging mission requirements. Our strategies must ensure that our medical response capabilities support operational requirements, are doctrinally prepared, well trained and resourced, and ready to meet the challenges of our overall missions.

2. MHS Goal 4 Benchmark Health Care System: We will be the benchmark health care delivery system; responsive to customer needs; where quality, access, and cost-effectiveness make us the first choice.

To be the benchmark health care delivery system, ensuring quality care is provided to our beneficiaries in all aspects of the military service, several key factors must be met. Therefore, we will clearly articulate, clarify, and educate our beneficiaries as to the military health care benefit. We will not only be effective in jointly resourcing our mission, but be good stewards and maximize effectiveness and efficiency in those day-to-day things we do to provide beneficiary benefits. We will also maintain our skills and capabilities on the cutting edge for our readiness mission.

3. MHS Goal 5 Technology Integration: We will integrate technologies to enable the best possible and most cost beneficial clinical and management outcomes.

This goal is generic to include all technologies and, not limited to the Information System (IS) stratum. Our first strategy is to identify both the core and advanced technologies and use them to the benefit of the MHS. Our second strategy identifies a continuous process (plan, procure, install, maintain) in the life-cycle management of technology to provide cost beneficial (versus cost-effective) solutions for approved MHS requirements.

1.4 Technical Architecture Framework For Integration Management (TAFIM)

The TAFIM provides direction for the evolution of the DoD technical infrastructure. Although it does not specify particular system architecture, it provides the services, standards, design concepts, components, and configurations that can be used to guide the development of technical architectures that meet specific mission requirements.

It is independent of mission-specific applications and their associated data. It introduces and promotes interoperability, portability, and scalability of DoD AISs. At the enterprise-level, it provides guidance for developing technical architectures that satisfy specific functional requirements. At the organizational level guide, it functions as a link to the enterprise level. To achieve an integrated enterprise, it is assumed that all AISs must interoperate at some time. Therefore, their architects and designers should use the TAFIM as the basis for developing a common target architecture to which systems can migrate, evolve, and interoperate. Over time, interoperability between and among the number of systems will increase, providing users with improved services needed to achieve common functional objectives. To achieve portability, standard interfaces will be developed and implemented. Scalability will be developed in mission applications to accommodate flexibility in the functionality. Proper application of the TAFIM guidance can do the following:

- Promote integration, interoperability, modularity, and flexibility;
- Guide acquisition and reuse; and,
- Speed delivery of IT and lower its costs

TAFIM applies to information system technical architectures at all DoD organization levels and environments (e.g., tactical, strategic, sustaining base, interfaces to weapons systems), and its usage within DoD is mandatory. Moreover, the specific technical architectures for missions and functions will be developed using standard architecture guidance and development methodologies provided by the TAFIM.¹

1.5 Office of Management and Budget (OMB) Circular A-130, Management of Federal Information Resources (1994)

The requirements of the Paperwork Reduction Act gave rise to this circular that mandates that Federal agencies perform their Information Resources Management (IRM) activities in an efficient, effective, and economical manner. This circular establishes OMB's oversight role in developing policy, establishing evaluation guidelines, and implementing management practices to determine the adequacy and efficiency of systems.

¹ DoD Technical Architecture Framework for Information Management (TAFIM), 30 June 94, Volume 1, "Overview - Version 2.0"

1.6 OMB Circular A-123, Management Accountability and Control (1995)

This circular provides guidance to managers in Federal government agencies for complying with the requirements of the Federal Managers' Financial Integrity Act. Agency managers are responsible for ensuring the accountability and effectiveness of Federal programs. Managers are also charged with informing employees of the requirement to use government resources efficiently, while avoiding waste, fraud, and mismanagement. Management controls, the plan of an organization to ensure that goals are met, are to be implemented as tools to achieve the program's intended results.

1.7 OMB Circular A-94, Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs (29 October 1992)

This circular promotes efficient resource allocation through well-informed decision-making by the Federal Government. It provides general guidance for conducting benefit-cost (also called Cost/Benefit Analyses (CBAs)) and Cost-Effectiveness Analyses (CEAs). It also provides specific guidance on the discount rates to be used in evaluating Federal programs whose benefits and costs are distributed over time. The general guidance will serve as a checklist of whether an agency has considered and properly dealt with all the elements for sound benefit-cost and cost-effectiveness analysis.

1.8 Public Law: The Government Performance Results Act of 1993

Beginning in 1997 the Government Performance Results Act of 1993 requires all Federal agencies to write a strategic plan that includes mission statement, outcome-based goals and objectives, description of how goals will be achieved, resource needs and how objectives will link performance plans, a list of external influences on goals, and a program evaluation schedule. It also requires agencies to write an annual performance plan and submit an annual performance report comparing actual to planned performance levels. Measures of success must be realistic, measurable, results-oriented, and strategic objectives.

1.9 Office of the Director, Program Analysis and Evaluation (OD PA&E), Automated Information System (AIS) Economic Analysis Guide, 1 May 1995

This document gives guidance for DoD automated information system economic analysis documentation that includes life-cycle cost estimates, life-cycle benefits estimates, and return on investment. The document contains a cost element structure and a work breakdown structure. The document provides overviews of both cost and benefit estimating techniques. For a complete summary of the Economic Analysis Guide, see the MHS IM/IT Benefits Management Program Supplement (Toolkit), Part 2.

2. STEP 1—INFORMATION MANAGEMENT/INFORMATION TECHNOLOGY (IM/IT) BUSINESS PROCESS REENGINEERING (BPR) INITIATIVE

This section provides supplemental material related to the development of a performance-based evaluation framework for a functional area or activity as part of an IM/IT BPR initiative (for additional information, see Section 2 of the Military Health System (MHS) IM/IT Benefits Management Program Guidebook). This is the first step in the MHS IM/IT Benefits Management Program. Section 2.1 provides an overview of analytic techniques including an abstract of performance measurement in health care. Section 2.2 provides examples of performance measures by functional area as they are used in industry. Finally, Section 2.3 presents a bibliography from the field of operational performance measurement.

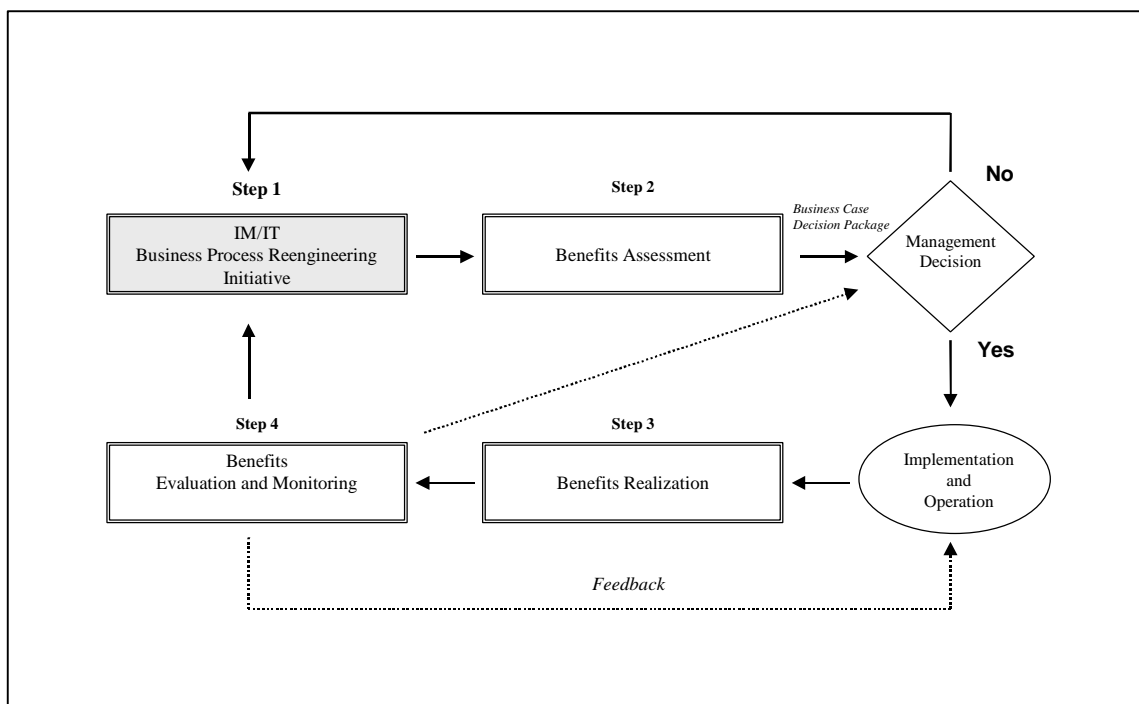


Figure 2
Step 1—IM/IT BPR Initiative

2.1 Performance Measurement Analytical Techniques

2.1.1 The Balanced Scorecard—A Structured Use of Performance Measures

2.1.1.1 Purpose and Background

The linking of an organization's strategic goals and objectives to its performance is a critical step for Functional Managers (FMs), Technical Program Managers (TPMs), and System Project Managers within the MHS. They must be able to demonstrate both the cost-effectiveness of their program and its relevance to the broader goals established by the MHS. One suggested method for achieving a balanced view of a program's performance, while linking it to both program goals and MHS goal, is the approach offered by Robert S. Kaplan and David P. Norton of the Harvard School of Business.

Robert S. Kaplan and David P. Norton have written extensively on the use of a "balanced scorecard" approach to supplement traditional financial measures with criteria that measured performance from three additional perspectives - those of customers, internal business processes, and learning and growth. The scorecard allows managers to introduce four management processes that, separately and in combination, contribute to linking long-term strategic objectives with short-term actions.

2.1.1.2 The Four Processes of Management Strategy

1. **Translating the Vision:** Organizational "vision" and "strategy statements" are not readily translated by organization members into action. For employees to act on these, statements must be expressed as integrated sets of objectives and measures and agreed upon by the senior leadership.
2. **Communication and Linking:** Provides managers with the ability to communicate their strategy up and down the organization and link to departmental and individual objectives. All levels of the organization understand the long-term strategy and that both subordinate elements and individuals objectives are aligned with it.
3. **Business Planning:** Enables organizations to integrate their financial and business plans.
4. **Feedback and Learning:** Provides organizations the capacity for strategic learning. Using the balanced scorecard enables organizations to use short-term results from the perspectives of internal business, customer, and learning and growth to modify strategies in light of recent performance, enabling them to modify strategies to reflect real-time learning.

2.1.2 Abstracts of Major Articles Related to Analytic Techniques

Drummond, Michael, et al. “Standardizing Methodologies for Economic Evaluation in Health Care: Practice, Problems, and Potential.” *International Journal of Technology Assessment in Health Care*, 9:1 (1993), 26-36. This article responds to the exponential growth in economic evaluation in health care literature by exploring the potential for standardizing the analytic methodology. Economic studies are becoming more influential with health care decision-makers as the range and quality of analytical work has improved. The development of standards for economic evaluation methods may help maintain the scientific quality of studies, facilitate the comparison of economic evaluations for different health care interventions, and assist in the interpretation of results from setting to setting. However, standardization might unnecessarily stifle methodological developments and produce the inability to accommodate different perspectives and settings.

Udvarhelyi, I. Steven, et al. “Cost Effectiveness and Cost Benefit Analyses in the Medical Literature: Are the Methods Being Used Correctly?” *Annals of Internal Medicine*. 1992; 116:238-244. A sample of 77 articles written between 1978 and 1987 were reviewed to determine whether published Cost-Effectiveness Analyses (CEAs) and Cost-Benefit Analyses (CBAs) have adhered to basic analytic principles. Six principles listed as essential for a thorough analysis were as follows:

1. Explicit statement of perspective;
2. Explicit description of benefits;
3. Specific type of costs;
4. Discounting if the costs and benefits accrue in different time periods;
5. Sensitivity analysis; and,
6. Summary measurement in marginal or incremental terms.

Despite an increased interest in health care economics, there was no improvement in the methods of analysis. The median number of principles to which analyses adhered was three. Only 4 percent of the analyses were consistent with all six of the basic principles. One should be cautious when accepting conclusions without scrutinizing the analytic techniques.

U.S. Congress, Office of Technology Assessment, *Bringing Health Care Online: Role of Information Technologies*, 1995. The role of IT in transforming the delivery of health care was reviewed to identify innovations and new challenges. Reducing the cost of delivering health care is probably Congress’ main motivation for pursuing the use of IT. The recommended methodology for cost analysis involved the generally accepted steps. Unique problems of evaluating IT were presented:

- Difficulty conducting comparative studies;
- Frequent change in available technology and their respective costs;
- Quick obsolescence in even well-conducted analyses;
- Difficulty identifying and quantifying appropriate costs, savings, and effects; and,
- Difficulty identifying and quantifying indirect costs.

Weinstein, Milton and William Stason. Foundations of cost-effectiveness analysis for health and medical practices. *New England Journal of Medicine*. 1977; 296:716-21.

This primer on cost-effectiveness sparked a surge in economic analysis in clinical journals. It is in response to the rising health expenditure (\$120 billion in 1976) and allocation decisions based on limited resources. Confusion often results from the names of two technically different analytical approaches being used interchangeably. A key distinction is that benefit-cost analysis must value all outcomes in monetary terms and cost-effectiveness analysis places priorities on alternative expenditures without requiring a dollar value to be assessed. The authors concluded that the analytic methodology should be adaptable to the needs of various health care decision-makers.

2.2 Performance Measures used in Industry

This compilation of potential measures is included to stimulate your thinking about appropriate measures. However, remember that the measures you select should fit the process, products, and goals of your specific program.

2.2.1 Health Care Delivery Performance Measurements

Average Length Of Stay (ALOS) By Product Line	Average Paid Full-Time Equivalent (FTE) Per Adjusted Occupied Bed
Percentage Of Population Enrolled	Percentage Care Delivered By Product Line By Demographic Group
Cost Per Occupied Bed Day	Cost Per Ambulatory Adjusted Occupied Bed Day
Technical Error Rates Per Procedure	Percentage Of Patient Records Available At Patient Presentation for Care
Average Diagnostic Cycle Time	Average Net Operating Margin Per Adjusted Discharge
Population Wellness	Average Percent Net Managed Care Revenue To Net Operating Revenue
Patient Satisfaction Index	Health Care Provider Satisfaction Index
Immunization Rates Per Demographic Group	Population Productivity Measures

2.2.2 Accounting Performance Measurements

Percent Of Late Reports	Percent Of Errors In Reports
Errors In Input To Information Services	Errors Reported By Outside Auditors
Percent Of Input Errors Detected	Number Of Complaints By Users
Number Of Hours Per Week Correcting Or Changing Documents	Number Of Complaints About Inefficiencies Or Excessive Paper
Amount Of Time Spent Appraising/Correcting Input Errors	Payroll Processing Time
Percent Of Errors In Payroll	Length Of Time To Prepare And Send A Bill
Length Of Time Billed And Not Received	Number Of Final Accounting Jobs Rerun
Number Of Equipment Sales Miscoded	Amount Of Intra-Company Accounting Bill-Back Activity
Time Spent Correcting Erroneous Inputs	Number Of Open Items
Percent Of Deviations From Cash Plan	Percent Of Advances Outstanding
Travel Expense Accounts Processed In Three Days	Credit Turnaround Time
Percent Data Entry Errors In Accounts Payable And General Ledger	Percent Of Shipments Requiring More Than One Attempt To Invoice
Machine Billing Turnaround Time	Average Number Of Days From Receipt To Processing
Number Of Untimely Supplier Invoices Processed	

2.2.3 Clerical Performance Measurements

Misfiles Per Week	Paper Waste
Errors Per Typed Page	Administration Errors (Not Using The Right Procedure)
Number Of Times Messages Are Not Delivered	Percent Of Action Items Not Done On Schedule
Percent Of Inputs Not Received On Schedule	Percent Of Coding Errors On Time Cards
Period Reports Not Completed On Schedule	Percent Of Phone Calls Answered Within Two Rings
Percent Of Phone Calls Dialed Correctly	Pages Processed Error-Free Per Hour
Clerical Personnel/Personnel Support	Percent Of Pages Retyped
Percent Of Impressions Reprinted	

2.2.4 Legal Performance Measurements

Percent Of Claims Lost	Time To Prepare For Claims
Response Time On Request For Legal Opinions	Average Cost Per Claim Settled

2.2.5 Management Performance Measurements

Security Violations Per Year	Percent Variation From Budget
Percent Of Target Dates Missed	Percent Personnel Turnover Rate
Percent Increase In Output Per Employee	Percent Absenteeism
Percent Error In Planning Estimates	Percent Of Output Delivered On Schedule
Percent Of Employees Promoted To Better Jobs	Department Morale Index
Percent Of Meetings That Start And End On Schedule	Percent Of Employee Time Spent On First-Time Output
Number Of Job Improvement Ideas Per Employee	Ratio Of Direct To Indirect Employees
Increased Percent Of Market	ROI
Percent Of Appraisals Done On Schedule	Percent Of Changes To Project Equipment Required
Normal Appraisal Distribution	Percent Of Employee Output That Is Measured
Number Of Grievances Per Month	Number Of Open Doors Per Month
Percent Of Professional Employees Active In Professional Societies	Percent Of Managers Active In Community Activities
Number Of Security Violations Per Month	Percent Of Time Program Plans Are Met
Percent Of Documents That Require Two Management	Percent Of Employees Who Can Detect And Repair Their Own Errors
Percent Of Delinquent Suggestions	Improvement In Opinion Surveys
Number Of Decisions Made By Higher-Level Management Than Required By Procedures	Percent Of Time Cards That Have Errors On Them Signed By Managers
Percent Of Employees Taking Higher Education	Number Of Damaged Equipment And Property Reports
Number Of Employees Dropping Out Of Classes	Percent Error In Personnel Records
Improvement In Customer Satisfaction Survey	Volume Actual Versus Planned
Revenue Actual Versus Planned	Percent Of Procedures Less Than 10 Pages
Number Of Procedures With Fewer Than Three Acronyms And Abbreviations	Number Of Formal Reviews Before Plans Are Approved
Percent Of Employees Active In Improvement Teams	Number Of Hours Per Year Of Career And Skill Development Training Per Employee
Number Of User Complaints Per Month	Number Of Variances In Capital Spending
Percent Revenue/Expense Ratio Below Plan	Percent Of Departments With Disaster Recovery Plans
Percent Of Appraisals With Quality As A Line Item That Makes Up More Than 30 Percent Of The Evaluation	Percent Of Employees With Development Plans
Direct/Indirect Ratio	Revenue Generated Over Strategic Period
Number Of Employees Participating In Cost Effectiveness	Result Of Peer Reviews
Number Of Tasks For Which Actual Time Exceeded Estimated Time	Dollars Saved Per Employee Due To New Ideas and/or Methods
Data Integrity Warranty Costs Cost Of Poor Quality	Number Of Iterations Of Strategic Plan

2.2.6 Personnel Performance Measurements

Percent Of Employees Who Leave During The First Year	Number Of Days To Answer Suggestions
Number Of Suggestions Resubmitted And Approved	Turnover Rate Due To Poor Performance
Number Of Grievances Per Month	Percent Of Employment Requests Filled On Schedule
Number Of Days To Fill An Employment Request	Time To Process An Applicant
Average Time A Visitor Spends In Lobby	Time To Get Security Clearance
Time To Process Insurance Claims	Percent Of Employees Participating In Company-Sponsored Activities
Percent Of Complaints About Salary	Percent Of Personnel Problems Handled By Employees' Managers
Percent Of Employees Participating In Voluntary Health Screening	Percent Of Offers Accepted
Percent Of Retirees Contacted Yearly By Phone	Percent Of Training Classes Evaluated Excellent
Percent Deviation To Resource Plan	Wait Time In Medical Department
Number Of Days To Respond To Applicant	Percent Of Promotions And Management Changes Publicized
Percent Of Error-Free Newsletters	Personnel Cost Per Employee
Cost Per New Employee	Management Evaluation Of Management Education Courses
Opinion Survey Ratings	

2.2.7 Quality Assurance Performance Measurements

Percent Error In Reliability Projections	Percent Of Product That Meets Customer Expectations
Time To Answer Customer Complaints	Number Of Customer Complaints
Number Of Errors Detected During Design And Process Reviews	Percent Of Employees Active In Professional Societies
Number Of Audits Performed On Schedule	Percent Of QA Personnel To Total Personnel
Percent Of Quality Inspectors To Manufacturing Directs	Percent Of QEs To Product And Manufacturing Engineers
Number Of Engineering Changes After Design Review	Number Of Process Changes After Process Qualification
Errors In Reports	Time To Correct A Problem
Percent Of Suppliers At 100 Percent Lot Acceptance For One Year	Percent Of Lots Going Directly To Stock
Percent Of Problems Identified In The Field	Variations Between Inspectors Doing The Same Job
Percent Of Reports Published On Schedule	Number Of Complaints From Manufacturing Management
Percent Of Field Returns Correctly Analyzed	Time To Identify And Solve Problems
Percent Of Lab Services Not Completed On Schedule	Percent Of Improvement In Early Detection Of Major Design Errors
Percent Of Errors In Defect Records	Number Of Reject Orders Not Dispositioned In Five Days
Number Of Customer Calls To Report Errors	Number Of Committed Supplier Plans In Place
Percent Of Correlated Test Results With Suppliers	Receiving Inspection Cycle Time
Number Of Requests For Corrective Action Being Processed	Number Of Off-Specifications Approved
Time Required To Process A Request For Corrective Action	Percent Of Part Numbers Going Directly To Stock
Number Of Manufacturing Interruptions Caused By Supplier Parts	Percent Of Error In Predicting Customer Performance
Percent Of Product Cost Related To Appraisal Scrap And Rework	Percent Of Skip Lot Inspection
Percent Of Qualified Suppliers	Number Of Problems Identified In-Process
Level Of Customer Surveys	

2.2.8 Information Technology Performance Measurements

Keypunch Errors Per Day	Input Correction On Data Entry
Reruns Caused By Operator Error	Percent Of Reports Delivered On Schedule
Errors Per Thousand Lines Of Code	Number Of Changes After The Program Is Coded
Percent Of Time Required To Debug Programs	Number Of Cost Estimates Revised
Percent Of Error In Forecast	Percent Of Error In Lines Of Code Required
Number Of Coding Errors Found During Formal Testing	Number Of Test Case Errors
Number Of Test Case Runs Before Success	Number Of Revisions To Plan
Number Of Documentation Errors	Number Of Revisions To Program Objectives
Number Of Errors Found After Formal Test	Number Of Error-Free Programs Delivered To Customer
Number Of Process Step Errors Before A Correct Package Is Ready	Number Of Revisions To Checkpoint Plan
Number Of Changes To Customer Requirements	Percent Of Programs Not Flow-Diagrammed
Percent Of Customer Problems Not Corrected Per Schedule	Percent Of Problems Uncovered Before Design Release
Percent Change In Customer Satisfaction Survey	Percent Of Defect-Free Artwork
System Availability	Terminal Response Time
Time Before Help Calls Are Answered	Rework Costs Resulting From Computer Program
Mean Time Between System Repairs	

These performance measures were extracted from “*How to Measure Performance A Handbook of Techniques and Tools*,” which was prepared by the Training Resources and Data Exchange (TRADE) Performance-Based Management Special Interest Group for the Special Project Group Assistant Secretary for Defense (ASD) Programs; and the Office of Operating Experience, Analysis and Feedback; Assistant Secretary for Environment, Safety and Health; and the United States Department of Energy, October 1995 performed under Contract No. DE-AC05-76OR00033 between the United States Department of Energy and Oak Ridge Associated Universities and (2) “Using Operational Benchmark Data for Strategic Cost Management,” Supplement to Healthcare Financial Management, Copyright 1996, Healthcare Financial Management Association, Westchester, Ill, 60154.

2.3 Operational Performance Measurement Bibliography

- Adams, Scot M., et al. "The Development of Strategic Performance Metrics," *Engineering Management Journal*, vol. 7 no. 1 March 1995.
- Berg, Connie M. "Paying the Price and Liking It: Justifying IT Expenditures," *Healthcare Informatics*, August 1995 12(8):50-2, 54, 56.
- Blackerby, Phillip. "Strategic Planning, An Overview for Complying with Government Performance and Results Act (GPRA) of 1993 (P.L. 103-62)," originally published in *Armed Forces Comptroller* vol. 39 no. 1 (Winter 1994), 17-22
- Brynjolfsson, Erik. "The Productivity Paradox of Information Technology," *Business Computing—Communications of the ACM*. (December 1993): 67-77.
- Coffey, Richard J., et al. "Relationships among quality assurance, quality improvement, and reengineering," *Healthcare Information Management*. Fall 1994; 8(4):5-10.
- Dickey, David. "Clinical Engineering Helps Reduce Equipment Costs," *Healthcare Financial Management*. September 1995, 50-53.
- Dummond, E.J., "Making the Best of Performance Measures and Information," *International Journal of Operations and Production Management*. 14,9 (1994): 16-31.
- General Accounting Office. *Executive Guide: Improving Mission Performance Through Strategic Information Management and Technology*. GAO/AIMD-94-115, May 1994.
- Gibson, D., Et al. "Case Study: Reducing Costs and Remaining Technologically Competitive with Asset Management," *Hospital Technology Services*. July 1995, 14(7):9-10
- Kaplan, Robert S. and David P. Norton. "The Balanced Scorecard - Measures that Drive Performance," *Harvard Business Review*. January-February 1992.
- Kaplan, Robert S. and David P. Norton. "Using the Balanced Scorecard as a Strategic Management System," *Harvard Business Review*. January-February 1996.
- Kian, L.A. "Justifying the cost of a computer-based patient record," *Healthcare Financial Management*. July 1995; 49(7):58-67.
- Kinghorn, C. Morgan., et. al., Information Management Performance Measures, Developing Performance Measures and Management Controls for Migration Systems, Data Standards, and Process Improvements in the Department of Defense, National Academy of Public Administration, November 1995
- Lay, C.M., et al. "A stakeholder's communication approach for balancing hospital information systems investment priorities," *Healthcare Management Forum*. Spring 1995; 8(1):5-30 (37 ref).
- National Academy of Public Administration. *Toward Useful Performance Measurement: Lessons Learned for Initial Pilot Performance Plans*. November 1994.
- Omachonu, Vincent. *Total Quality and Productivity Management in Health Care Organizations*. Norcross GA: Institute of Industrial Engineers, 1991.
- Ryan, S. A quantitative approach to quality improvement and resource allocation," *Journal of Quality Clinical Practices*. March 1995; 15(1):11-16.
- "Survey forecasts future I/T expenditures." *Health Management Technology*. February 1995; 16(2):54.
- Thuesen, G.J. and W.J. Fabrycky. *Engineering Economy*. Englewood Cliffs, NJ: Prentice-Hall, 1984.
- US Office of Management and Budget. *Evaluating Information Technology Investments, Version 1.0*. Washington DC: U.S. Office of Management 7 Budget, November 1995.

3. STEP 2—BENEFITS ASSESSMENT

This section provides supplemental material related to benefits assessment prior to decision-making (for additional information, see Section 3 of the *Military Health System (MHS) Information Management/Information Technology (IM/IT) Benefits Management Program Guidebook*). This is the second step in MHS IM/IT Benefits Management Program. Section 3.1 provides an overview of the benefits assessment process. Section 3.2 describes how benefits are categorized including definitions for cost benefits, and how to develop benefit estimates. Section 3.3 describes the development of cost estimates and Section 3.4 describes how to create credible benefits estimates. Section 3.5 provides an overview of the data sources for benefits estimates. Section 3.6 gives an overview of the Functional Economic Analysis (FEA) process.

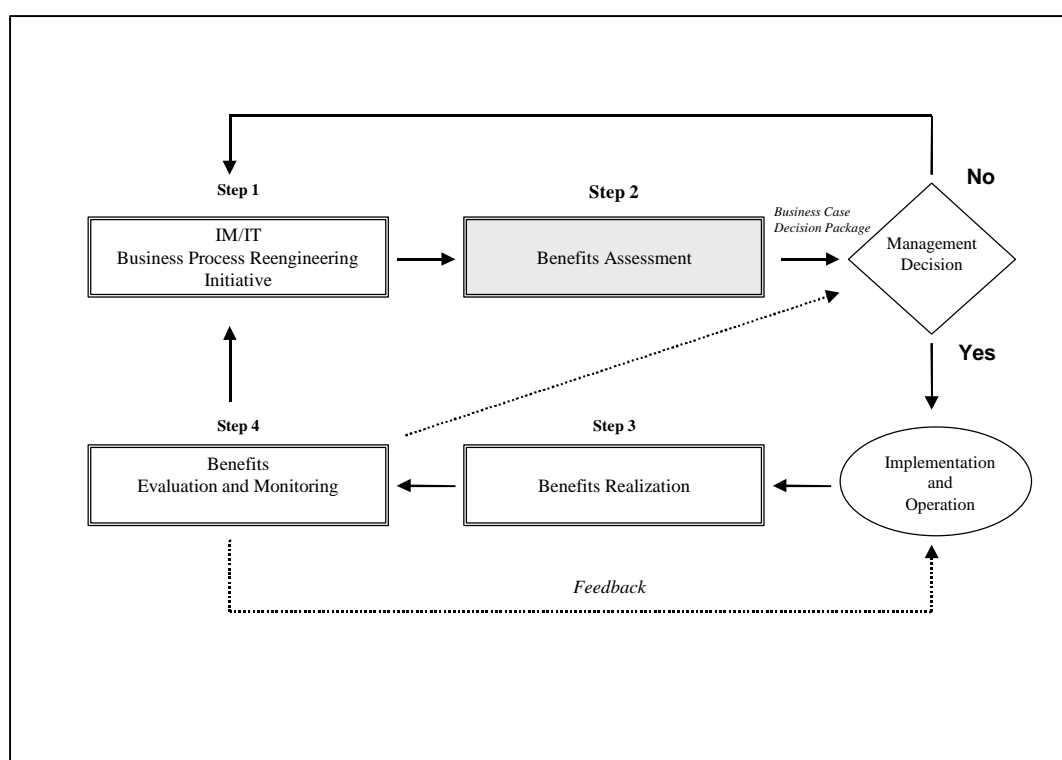


Figure 3
Step 2—Benefits Assessment

3.1 Benefits Assessment Process

Benefits Assessment is the process of quantifying the expected Return on Investment (ROI) of an IM/IT proposal. The predominant consideration in conducting benefits assessment for an AIS is the need to identify, document, and validate those quantitative and qualitative benefits that will be most relevant and convincing to decision-makers. As a means to support this decision, the study

should validate those benefits directly attributable to the IM/IT project and provide direct methods for their measurement.

3.2 Categorize Benefits

Program Analysis and Evaluation (PA&E) (which describes Economic Analysis/Analysis of Alternatives) guidelines dictate that benefits identified as savings be mapped to established Cost Element Structure (CES) criteria,² while FEA guidance provides higher level cost elements to use in analysis. The MHS IM/IT Benefits Management Program requires that MHS IM/IT managers report the impact of their Business Process Reengineering (BPR) Initiatives in one of the following categories: cost, quality, access, and medical readiness benefits. This will be accomplished by the use of performance measures that are developed by the respective Functional Managers (FMs), Technical Program Managers (TPMs), and the Functional Proponent Working Group (FPWG) as part of their strategic and program planning processes.

3.2.1 Define Cost Benefits

In both PA&E policy and FEA guidance, cost benefits are defined as reductions in the direct resource requirements, (dollars), to meet mission requirements. Therefore, an estimate of the status quo resource requirements of the functional area is necessary to begin the process of quantifying cost benefits of an improvement program. The next section provides an overview of existing guidance related to cost estimating for IM/IT programs.

² OASD(PA&E), "PA&E AIS Economic Analysis Guide."

3.3 Developing Cost Estimates

Financial benefits are based on the discounted amount of forecast future net cash flows (Net Present Value (NPV)) of the proposed alternative as compared to the status quo.³ PA&E guidance suggest that the proposed AIS ROI should be at least 10% above the status quo. PA&E also identifies four generally acceptable techniques for estimating costs.⁴ They are the following:

- Cost Estimating Relationships (CERs): Employs regression analysis against the historical database.
- Analogy: Compares the unknown item to a known one (i.e., currently deployed system) and extrapolate the results.
- Engineering (Bottoms Up): Sums the component parts. Ideal for systems where costs can be broken down into specific elements.
- Prototype: Uses a prototype model as a basis for extrapolating data about actual costs to implement the system.

These cost estimating techniques would be used to estimate the costs of the functional activity in the status quo and any proposed status quo alternatives. In this approach, net financial benefits are represented as cost-benefits, that is, any cost benefits resulting from BPRs would be reflected in a reduced total cost of the functional activity for example, PEA. In the FEA guidance, the major cost categories are civilian labor, military labor, information technology, facilities, materiel, and other.⁵ The following is a summary of the types of items found in each.

³ OASD (PA&E), "PA&E AIS Economic Analysis Guide." NPV analysis assumes that a dollar today is worth more than a dollar received tomorrow since today's dollar has the ability to be invested and earn interest immediately. Therefore, the difference (i.e., net) present value is the amount of interest earned by the dollar invested today, using the prevailing discount rate. The discount rate is the rate that the money "could have earned" had it been invested elsewhere (i.e., the opportunity cost of the money). For Department of Defense (DoD) purposes, the discount rates are determined by Office of Management and Budget (OMB) and are published annually in OMB Circular A-94. The basic present value formula is the following:

$$PV = FV / (1+i)^n$$

Where: PV = Present Value
FV = Future Value
i = Interest or Discount Rate
n = Number of time Periods (usually years)

And, the sum of all the project's Present Values (one per period) is equal to the NPV of the project. In formula terms:

$$NPV = \sum PV_1 + PV_2 + PV_3 + \dots + PV_n$$

⁴ OASD (PA&E), "AIS Economic Analysis Guide."

⁵ DoD Corporate Information Management, *Functional Economic Analysis Guidebook*, January 1993, Section 2 pp 13-14.

Civilian Labor: Total civilian pay cost, both gross pay and all personnel benefits (e.g., retirement, health insurance, etc.)

Military Labor: Total costs of all officer and enlisted pay, including allowances and retirement.

Information Technology: The cost of hardware (including peripheral equipment), software, and related telecommunications equipment purchased from commercial sources. Non-cash charges such as depreciation and amortization should be excluded.

Facilities: All costs involved in owning, leasing, and operating a facility. This includes costs for construction (including modifications), if Purchased; leasing costs, if rented; appropriate utility charges, repair and maintenance; and services. Non-cash charges such as depreciation should be excluded.

Material: The costs associated with purchases of office furniture, equipment (non-computer), and supplies, including printing and postage. Non-cash charges such as depreciation should be excluded.

Other: Costs such as project travel, specific job-related technical training, and transportation that are not covered by any of the other cost elements. Also, includes hardware and software maintenance and support and telecommunications usage costs (not investment). All non-cash charges such as depreciation and amortization should be excluded.

These categories are adequate for analyses at a summary level, and they are appropriate for reporting in an EA/AOA. However, in documenting IT programs for PA&E evaluation, the TPM would have the requirement to allocate costs down to the detailed CES level.⁶

These detailed CES' can then be summarized and crosswalked into both the system's current stage in the programmatic life cycle⁷ and the cost of doing the functional business. Additionally, sunk costs (i.e., already spent) should be ignored from any decision alternative analysis. These costs would only be included in the totals summarizing the system's total life-cycle costs. Evaluation should instead be based on marginal (incremental) costs associated with both the baseline and each proposed alternative.⁸

3.3.1 Not all Dollar Values are Equivalent

⁶ OASD (PA&E), "Program Manager's Reference to the OD (PA&E) AIS Economic Analysis Guide."

⁷ DoD Corporate Information Management, "Functional Economic Analysis Guidebook," January 1993.

⁸ OASD (PA&E), "Program Manager's Reference to the OD (PA&E) AIS Economic Analysis Guide".

The preceding section describes *how* cost estimates are to be constructed and presented according to established guidance. This section discusses important distinctions among types of dollar-valued benefits and how the types of dollar benefits are to be reported.

In current guidance, three broad categories of dollar-valued benefits are identified: cost savings, cost avoidance, and productivity improvements. A summary of each is provided from the Office of the Director (OD) PA&E AIS Economic Analysis Guide, May 1995.

Cost Savings:	A readily quantifiable reduction to the approved program costs over the duration of the Program Objective Memorandum (POM) period.
Cost Avoidance:	Reductions in a future resource requirement associated with a program that has not yet been approved and consequently, has no funding included in the POM period.
Productivity Improvements, or Opportunity Cost Benefits:	This represents reductions in projected requirements that enables the approved program to accomplish more with existing personnel. Improvements in productivity are differentiated from cost savings since they have no direct impact on projected future funding requirements.

3.3.2 Financial Savings

Cost benefits that represent reductions in currently programmed MHS funding are called cost or financial savings. It is usually necessary to have knowledge of the current programmed resources for the functional activities in the status quo to adequately determine whether a given cost benefit is a cost savings, a cost avoidance, or a productivity improvement. Typically, there is not one budget source to consider in building the status quo resource cost. The improvement program may cut across resources of the Services, facilities and regions requiring that Military Department and civilian personnel costs be consolidated from multiple budget line items. Improvements that impact on medical materiel could involve resources at the retail or the wholesale levels which, again, requires consolidating resource estimates from multiple sources. All direct Department of Defense (DoD) resources are accounted for in the Planning, Programming, and Budgeting System (PPBS).⁹ For a complete summary of the PPBS process, see the *MHS IM/IT Benefits Management Program Supplement (Toolkit)*, Part 2, Section 2.1.2.6.1.

3.3.3 Cost Avoidance Benefits

Cost avoidance benefits are estimates of reduced resource requirements that currently are not programmed for in the status quo program. In other words, cost avoidance benefits do not

⁹ DoD Corporate Information Management, "Functional Economic Analysis Guidebook," January 1993 Section G.

represent budgetary savings to the Defense Health Program or to DoD. They represent reductions in activities that may happen if preventive actions are not taken.

3.3.4 Opportunity Cost Benefits

The last category of cost benefit to consider is the *Opportunity Cost*¹⁰ benefit to the organization. Roughly stated, an opportunity cost benefit is a benefit measured in dollar terms that reflects the potential value generated by the benefit. Opportunity cost benefits are potential benefits, however, they represent value added improvements that are not likely to be realized as reduction in mission resources.

Dollar-valued estimates of time savings to either a Health Care Provider (HCP) or to a patient is a common example of an opportunity cost benefit. In the case of the HCP, the dollar value does not represent a reduction in force. Instead, it would represent the aggregation of blocks of time, (less than one full time equivalent), multiplied by a composite wage rate. The time savings creates the opportunity for that HCP to perform another productive activity; the value of that potential activity must be represented by a wage rate.

Within the framework of economic analysis, the opportunity cost doctrine is viewed as a more relevant notion of costs to society of a resource than relying on the market costs of resources. Societal costs and market costs may differ when there are distortions in the market, or when the market does not exist. Distortions may occur due to the presence of taxes, monopoly power, or externalities where actions such as pollution or congestion are not compensated in the marketplace. Markets may not exist for legal or ethical reasons, for example, in the case of valuing human life; markets may also fail to exist if the product is freely available to all, or if it is impossible to assess the value of the product prior to purchasing it. However, because the opportunity cost doctrine requires using the marginal value product of a resource to be determined, as opposed to using the market price of the product, opportunity cost calculations can be difficult and costly to make¹¹. And by implication, they can be difficult to interpret as a manager of an organization.

There are examples within MHS of IM/IT programs identifying process improvements that are first categorized as opportunity cost benefits, but, upon detailed analysis, the benefits actually generated cost savings to DoD. One case is the Dental Working Group. They identified that by providing basic preventive care, they could generate time savings to active duty patients. The time savings were generated as the result of reducing the rate of emergency care incidents that take mission ready forces out of mission ready status. Upon detailed study, the work group found that the incidence rate was quite high, thus providing significant potential troop time savings. The

¹⁰ Nicholson, Walter *Microeconomic Theory: Basic Principle and Extensions*, Second Edition, The Dryden Press, 1978. "Opportunity Cost Doctrine: The simple, though far-reaching, observation that the true cost of any action can be measured by the value of the best alternative that must be foregone when the action is taken." page 682. In other words, an opportunity cost benefit is a dollar-valued estimate of the potential value generated by a particular benefit. For example, if a benefit generates time savings of non-active duty patients, the opportunity cost benefit would be the time saved multiplied by an appropriate wage rate for specific individuals savings time. The determination of just what is an appropriate wage rate is the subject of academic debate and research. Guidance from the General Accounting Office (GAO) has been to apply current minimum wage rates to those time savings. GAO has also encouraged ROI presentation to clearly distinguish between cost savings and opportunity cost benefits.

¹¹ Nicholson, Walter. *Microeconomic Theory*, page 626.

final estimates of troop time savings was found by the Service line organizations to represent a meaningful increase in troop readiness and a resulting cost savings to line organizations.

3.3.5 Quality, Access, and Medical Readiness Benefits

As stated earlier, the MHS IM/IT Benefits Management Program organizes ROI decision-making by supplementing pure financial benefit measures with quality, access, and medical readiness factors. Thus, senior management is able to make efficient IM/IT funding evaluations based on all of the relevant data - rather than just focusing in on the “bottom line.” For example, it is possible that an IM/IT investment opportunity could have negative financial benefits that are offset by positive benefits based on these other measures. Senior management would then have to evaluate the sum affect of all of the benefits when determining a “go” or “no go” decision.

Evaluating items such as the ones listed above can be done via a simple weighting and ranking mechanism whereby each value is assigned a rank and a weight¹². Then, the combined ranking and weights can be compared versus the status quo. It is the responsibility of the functional area managers and program managers to establish the relative weighting of their unique performance measures. It is also their responsibility to establish the target values for their performance measures.

$$\left. \begin{array}{l} \text{Quality} \\ \text{Access} \\ \text{Medical Readiness} \end{array} \right\} \text{Benefits} = \left[\left(\frac{\text{Index Value of Performance Measure in Alternative}}{\text{Index Value of Performance Measure in Baseline}} \right) - 1 \right] \times 100$$

(For each performance measure created)

¹² DoD AIS Economic Analysis Guide, 1 May 1995, Section E-6 Estimating Non-Quantifiable Benefits. This guide describes benefits that are not cost related as “...although not appropriate in cost analysis, may be important in the decision process.” The techniques described to compare include constructing a priori weighting values to apply to performance outcomes.

3.4 Create Credible Benefits

The perceived credibility of an benefits estimate is a function of how sensitive the financial benefits result is to the inclusion of the opportunity cost benefits in the benefits estimate. In general, reporting the following data, when available, will increase the credibility of a benefits estimate:

- The source of benefits data;
- The risks or uncertainty in the cost and benefit estimates;
- The statistical expected value of the benefit and its 5th and 95th percentile values; and,
- In cases where opportunity cost benefits are included in the financial benefit, the financial benefit with and without the opportunity cost benefits.

3.5 Data Sources

To calculate the benefits in this step of the life cycle, it is necessary to collect sufficient data to estimate the benefits of the IM/IT project. The benefits are calculated as changes from the baseline values of the performance measures that were quantified in the MHS IM/IT Benefits Management Program Step 1. Benefits calculations frequently use a combination of the following data sources:

- Professional literature;
- Facilitation of subject matter experts (SMEs) group sessions; and,
- Analysis of MHS operational data from central sources such as the Defense Medical Information System (DMIS) family of systems or other sources of “live” data.

The use of professional literature to estimate benefits requires an understanding of how to apply the published data to the MHS baseline data. A technique called “normalizing” can be used to adjust data from outside sources in an attempt to make the published data more appropriate for use. While normalization is a widely used and productive technique to develop benefits estimates, the process can be quite subjective. Data normalization requires in-depth knowledge of both the derivation of the published data and the systems that generate the MHS baseline data.

Facilitation of subject matter expert group sessions to develop benefits estimates is another productive technique. Keys to success for this data collection technique are the following:

- Identification of objective SMEs;

- Use of a skilled facilitator to structure the time spent with the SMEs to elicit information; and,
- Availability of experienced health economists or operational analysts to work with the SMEs.

Standard data sources, prototyping efforts, and operational sampling techniques to collect data for benefits analysis bring with them similar strengths and weaknesses. The weakness of these techniques is that they require knowledge of the systems that generated them to best understand how to apply them to the benefits assessment. The strength of these techniques is that they can produce highly credible data.

When data are collected by sampling a population, the most important objective of a statistical analysis is to draw inferences or generalities about that population from the partial information represented in the data sample. The randomness of the data collected is central to the issue of data collection. Data collection applied to health care operations frequently demands the use of specialized techniques, such as stratified sampling, to account for practice pattern and population demand variations. In such cases, the need for larger sample sizes is increased because the special sampling techniques decrease the statistical degrees of freedom of the sample. On the other hand, an acceptable sample design can be achieved through the use of reasonable techniques and simulation modeling techniques.

In planning a study, an important practical decision must be made concerning the sample size required to achieve the desired protection against bias caused by a flawed estimation procedure. Large sample sizes translate into more costly and time consuming data collection and data processing, while small sample sizes increase the likelihood of standard error. Within the course of a typical benefits assessment, it is recommended that a sample size be selected that will allow a 90 percent level of confidence to be achieved, to balance the minimization of potential standard error against the cost of data collection and processing.

3.6 Functional Economic Analysis Process

The content of this section is summarized from the FEA Guidebook, January 1993, Office of the Assistant Secretary of Defense (OASD) Command, Control, Communications and Intelligence (C3I).

3.6.1 FEA Summary

FEA represents a management tool to evaluate investment alternatives with a functional activity. As such, they are required whenever decisions lead to or suggest additional investment expenditures for information technology. It is the principal document in a decision package that evaluates the proposed development of Information Systems (ISs) or changes to existing systems. They are used to do the following:

- Evaluate proposed courses of action;
- Present the business case for approving and implementing the proposed action; and,
- Reexamine at appropriate decision points (e.g., Life Cycle Management (LCM) milestones for IS changes) the business case for continuing or redirecting those actions. A properly conducted FEA should capture the full risk-adjusted costs and benefits of proposed changes in or development of new systems.

3.6.1.1 FEA Principles

Three general principles guide the development of the FEA methodology. These principles help define an FEA and demonstrate its usefulness in managing functional activities.

1. **Functional Focus:** The FEA should be designed to provide the manager with the bottom-line understanding needed to use all types of resources effectively in meeting DoD objectives. In the case of IT, this focus is necessary to assure that AIS investments are selected because of the benefits they will deliver to DoD functions, not solely because of technological considerations.
2. **Measurement:** The FEA methodology requires measurement of key attributes of functional processes, such as costs and outputs. For the functional manager, quantitative measures are important in assessing the current state of the function, in setting substantive objectives, in evaluating alternative ways to achieve those objectives, and in gauging progress toward the objectives.
3. **Management Tool:** The FEA, as an ongoing management tool, supports the business area functional manager in responding to analyses required for proposed information systems and for acquisition and programming/budgeting processes by showing both the costs and benefits of planned investments. FEAs include an analysis of process requirements or problems, proposed solutions, assumptions and constraints, alternatives, life-cycle costs (including the cost of conducting the analysis), CBA, and investment risk analysis.

3.7 Economic Analysis Tools

There are tools available that aid the Benefits Management Process. Cost Professional is a stand-alone economic analysis database manager for use in Windows 3.1, Windows 95, and Windows NT. OSD/PA&E provides CostPro to users performing economic analysis in support of Large Automated Information System acquisition. The software, as well as a users manual, is free off the Web at <http://www.kilgoresolutions.com/costpro.html>.

TurboBPR, a previously recommended tool, provides a template for consistent analysis of alternatives as well as an economic evaluation of BPR proposals. TurboBPR is meant as a high-level enterprise analysis tool and does not achieve Business Process Reengineering.

4. STEP 3—BENEFITS REALIZATION

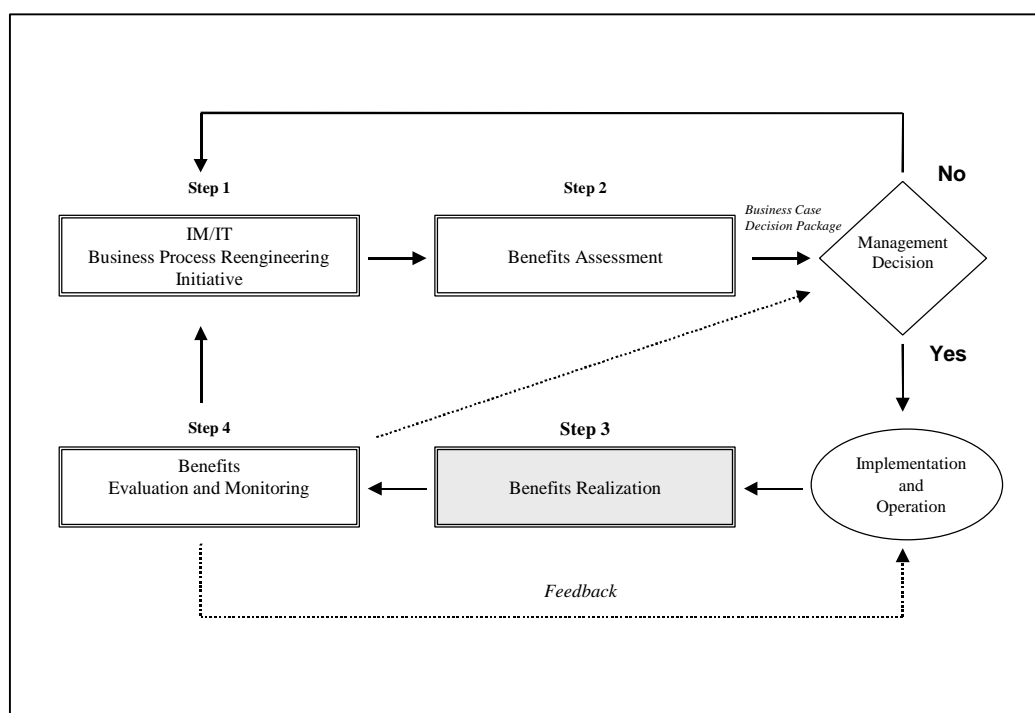


Figure 4
Step 3—Benefits Realization

4.1 Benefits Realization Process

This section provides supplemental material related to Benefits Realization, that is, comparing actual versus predicted benefits (for additional information, see Section 4 of the Military Health System (MHS) Information Management/Information Technology (IM/IT) Benefits Management Program Guidebook). This is the third step of the MHS IM/IT Benefits Management Program. Section 4.1 outlines the purpose of Benefits Realization and Section 4.2 provides an overview of the benefits realization process.

4.1.1 Purpose

The purpose of a formal benefits realization program is to support the IM/IT Functional Managers (FM)s, Technical Program Managers (TPMs), System Project Managers, Military Treatment Facility (MTF) Commanders, and their staff in the application and evaluation of benefits realization initiatives. There are three main components to the program:

1. Taking specific actions to increase benefits;
2. Monitoring actions taken to evaluate their effectiveness; and,
3. Documenting the lessons learned for use at future sites.

4.2 Process

Benefits Realization is a continuous cycle of opportunity identification, program development, trial deployment, and feedback. The first step in the process will be to document the benefits realization initiatives that have been undertaken at the sites where system deployment has occurred. Initiatives that site personnel believe have been successful will be documented and transmitted to subsequent sites. These subsequent sites should be monitored to determine what activities were adopted, how they were adapted, and what activities were abandoned.

Initiatives that prove unsuccessful, and those areas identified for additional analysis, will be documented. Where high-priority benefits are not being realized, the organization will be assessed to determine the causes for poor actualization of benefits. Based on this assessment, actions will be taken to develop these initiatives, in collaboration with site personnel. These interventions will be implemented and evaluated, and successful initiatives will be documented and applied at future sites. Where interventions are not successful, additional approaches will be defined, attempted, and evaluated. All experiences will be documented as Benefits Realization Lessons Learned for use by future sites in implementing the Automated Information System (AIS). These lessons learned will be updated as new initiatives are implemented and experience is gained at future sites.

The military Services are normally responsible for disseminating the documented benefits realization initiatives to future deployment sites. Benefits realization efforts are aimed at improving benefits, but they often consume resources as well. It is essential that the benefits realization programs deployed to future sites be cost effective. Therefore, evaluation of the benefits realization program is an essential part of the evaluation of the IM/IT project.

Initiatives that are deployed will be evaluated at initial deployment sites by monitoring implementation costs, modifications made, and outcomes (continuation or abandonment). In some cases, implementation monitoring data may permit a quantitative comparison of operations before and after a benefits realization initiative is undertaken. These data should be summarized across sites.

Each new initiative will be evaluated to determine whether the benefits are commensurate with the effort required to implement the initiative, to identify areas for improvement, and to isolate site-specific variables that may affect the success of the effort.

The entire nature of the benefits realization process is iterative. New (unspecified) benefits will continue to be validated at each facility. These initiatives will be undertaken and evaluated, successes identified, areas for more work identified, and experience documented and shared. An essential component of the entire process is a feedback and communication system. Effective communications

will ensure that unsuccessful initiatives are not repeated and successes are rapidly integrated into the implementation process.

5. STEP 4—BENEFITS EVALUATION AND MONITORING

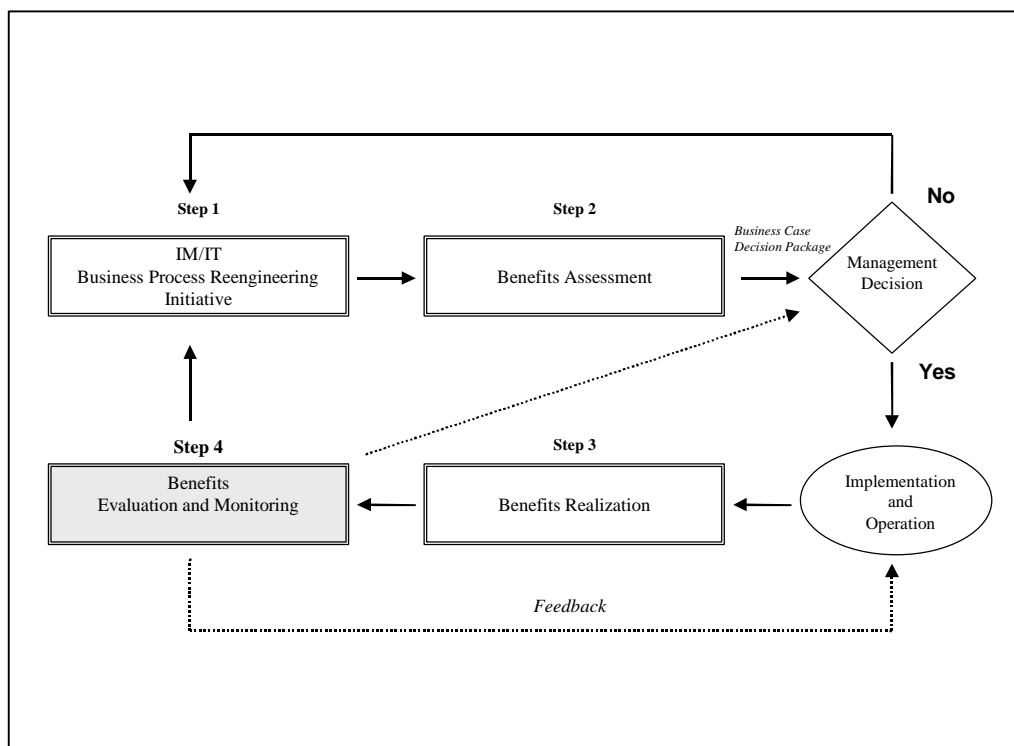


Figure 5
Step 4—Benefits Evaluation and Monitoring

This section provides supplemental material related to benefits evaluation and monitoring (for additional information, see Section 5 of the Military Health System (MHS) Information Management/Information Technology (IM/IT) Benefits Management Program Guidebook). This is the fourth step of the MHS IM/IT Benefits Management Program. Section 5.1 outlines the purpose for benefits management and some of the key players roles and responsibilities within benefits management. Section 5.2 provides an overview of the Functional Area benefits management process. And, Section 5.3 details how Information Management, Technology and Reengineering will manage the interpretation of benefits results.

5.1 Purpose

Once the process, data, and system baselines are established, management at all levels evaluates the programs for those improvement opportunities that are consistent with the overall functional objectives. Figure 5.1 illustrates the high-level roles and responsibilities for benefits management (for additional information concerning specifics on key participants roles and responsibilities, see Section 1.4.15 of the MHS IM/IT Benefits Management Program Guidebook).

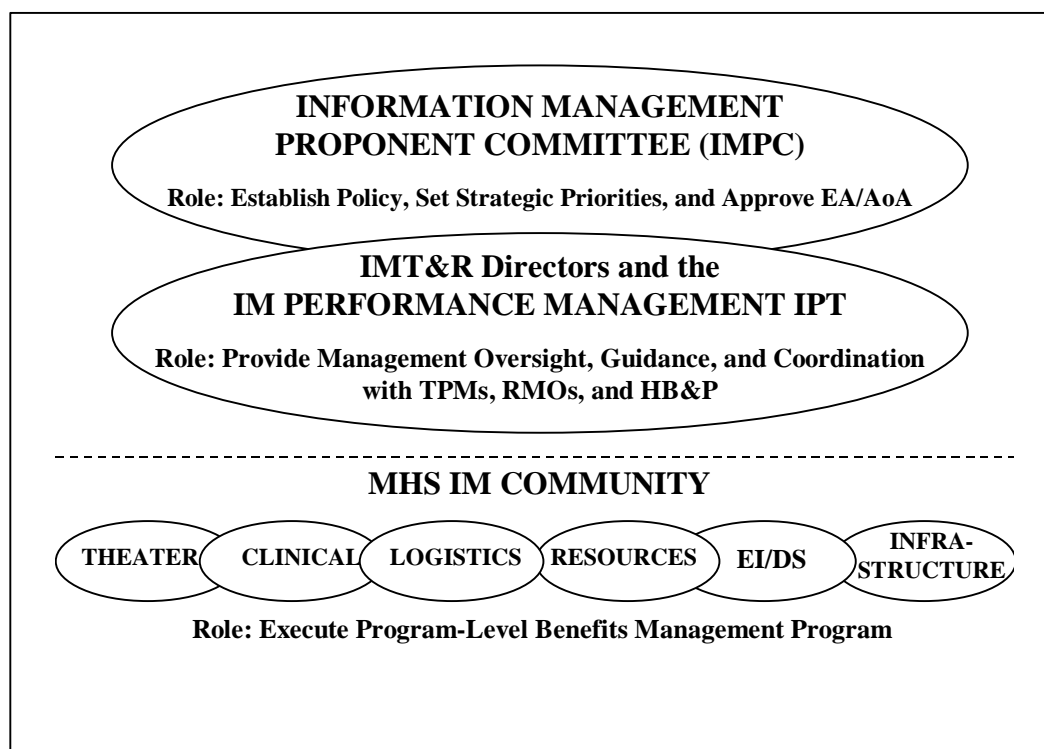


Figure 5.1
Roles and Responsibilities of the MHS IM/IT Benefits Management Program

The management of these improvement initiatives involves rapid elimination of non-value-added processes and streamlining those limited value-added processes. Once this has been done, a thorough modeling of those remaining initiatives having comprehensive program benefits is initiated. This entails developing extensive technical management and data management plans detailing the “as is” versus the “to be” environments. It also addresses methods and practices, data requirements, information system support needs, and quantitative benefits evaluations of each proposed alternative.

Implementation plans are then developed for these remaining initiatives. Prototyping can be an important step both to ensure that broad implementation is successful and to test and develop potential improvement opportunities before committing significant funding. This can be done before or after selection of the best alternative, but should be conducted in such a manner to not unnecessarily delay implementation. As these implementation plans are performed, data are updated, documented, and used as input into the revised strategic plans.

Thus, the feedback loop is established whereby changes are proposed and evaluated, approved changes are implemented, and baselines revised. Further review is conducted on the efficiency and effectiveness of the remaining processes. Each time a proposed process change is identified, the necessary changes to data requirements and the supporting information systems are defined. Thus, development is accomplished through rapid application of smaller, low-risk, incremental changes rather than radical, high-risk, overhauls of the existing processes.

5.2 Functional Area Benefits Management

The evaluation and oversight of IM/IT benefits at the functional area-level is designed as part of the MHS IM/IT Benefits Management Program. With this level of oversight, it is possible that IM/IT investment and operations decisions could be suboptimized due to inconsistent baseline measures, performance targets, and planning goals. Managing long-range IM/IT benefit targets and performance at the functional area-level will create additional value added to the MHS by providing a feedback mechanism to program managers, project officers, and to senior management with respect to adjustments to funding requirements.